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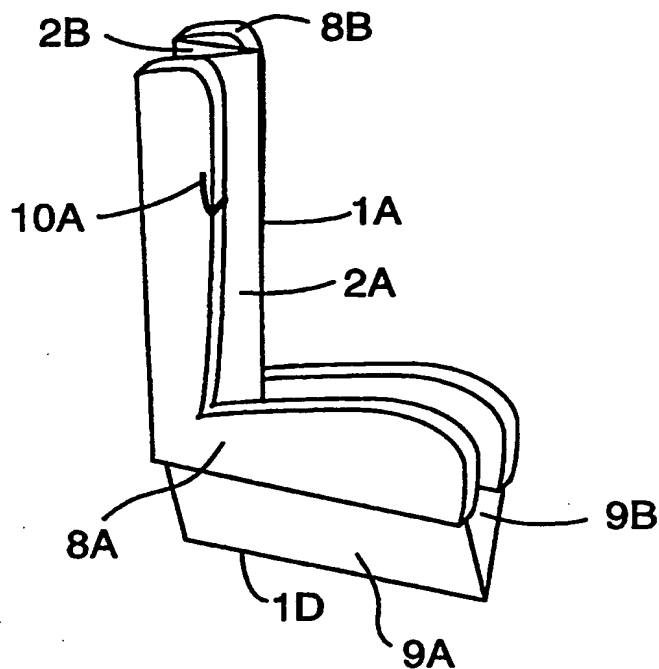
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(54) Title: CHILD'S SAFETY SEAT

(57) Abstract

A child's safety seat for motor vehicles comprises two side pieces, a seat and a back section, and it is foldable, as said pieces are movable towards one another by folding of the seat and back sections. It is also preferably lockable in unfolded condition by means of locking devices in the seat and back. Due to this design the folded safety seat requires little space and it can easily be stowed away when not in use.



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Childs Safety Seat.

The transportation of a large number of children in vehicles without restraints in child's safety seat is a problem, particularly in commercial traffic, in which such equipment is lacking in too many cars. One reason is that the current child's safety seats are not easy to fold or stow away, and are therefore from considerations of space not available in vehicles when needed. Lacking child's safety seat is most frequent in shorter trips.

A foldable child's safety seat needs little space and can easily be stowed in a car in an easily reachable place without limiting the space for another purposes. It might in many cases be placed for instance below one of the front seats or on another easily accessible place with a touch-and-close fastener or by other suitable means. The most significant feature of a child's safety seat according to this invention is that it is foldable, in that it includes two side pieces, a seat and a back, the said side pieces being movable toward each other by means of a folding motion of the seat and the back. Preferably the seat and the back can be locked in the unfolded condition by way of locking devices.

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One embodiment of the child's safety seat, for which patent protection is sought, uses six hinges, three of which are in the seat area and three in the back area. It is folded and unfolded with a simple action. The middle hinges in the seat and back are lockable through a system of movable spring loaded bars, which can hold the seat and back in the unfolded condition. The child's safety seat is preferably installed in the front or rear passenger seat of the vehicle by means of a vehicle seat belt. For this purpose the safety seat can be equipped with slots or guides and the seat belt may also be guided to restrain the child. Alternately the safety seat can be equipped with an integral seat belt for the child, and the safety seat may be installed by the seat belts or other means.

Figure 1 is a perspective view of a foldable child's safety seat in accordance with the invention, in its erect position;

Figure 2 is a perspective view of the child's safety seat shown in figure 1 in its folded position;

Figure 3 is a rear elevation of the back of the safety seat shown in Figure 1, with rear cover panels removed; and

Figure 4 is a rear elevation similar to figure 3, but with rear panels in place.

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The child's safety seat in Figure 1 is built of right and left side pieces 8A and 8B, a back section 2 made of right and left back pieces 2A and 2B, and a seat section 9 made of right and left seat pieces 9A and 9B. The safety seat is made of six main pieces, connected to each other with parallel hinges. The back 2 and seat 9 are hinged in the middle and along the sides. Thus, the right and left back pieces 2A and 2B are connected by respective right and left back hinges 1C and 1B (shown in Figures 3 and 4) to the right and left side pieces 8A and 8B and the right and left back pieces 2A and 2B are connected to each other by a middle back hinge 1A. In the same way the right and left seat pieces 9A and 9B are connected to each other and the right and left side piece 8A and 8B by a middle seat hinge 1D, right seat hinge 1F and left seat hinge 1E, respectively. The middle hinges 1A and 1D in the back and seat are in line with one another.

The safety seat can be fitted to the front or rear passenger seat of a vehicle by means of the vehicle seat belt. Guides 10A and 10B for the vehicle seat belt are provided on the side pieces 8A and 8B.

Referring to Figure 3, the back section 2 of the child's safety seat has a locking device consisting of two bars 3A and 3B, each movable in slides 6A and 6B, 6C and 6D respectively. The bars 3A and 3B are connected to opposite ends of a handle 4. The locking device functions as follows: the bars 3A and 3B cross the back middle hinge 1A and are biased by compression springs 5A and 5B into positions

crossing the back middle hinge 1A. By moving the handle 4 against the spring force to the left as viewed in Figure 3, the bars 3A and 3B move clear of the middle hinge 1A and the back section 2 is free to fold.

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Figure 2 shows the back section 2 folded forwards and the seat section 9 folded downwards, but there are other alternatives. For instance, the seat section may be folded upwards in order to make a compact package, in which case portions of the back section and/or the seat section may be shortened in order not to interfere with each other when folded. It is also possible to make both back and seat sections foldable outwards from the side pieces in order to make a flat package.

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Figure 4 shows three cover panels 7A, 7B and 7C, which cover springs 5A and 5B and bars 3A and 3B on the back side of the back section. Three similar cover panels (not shown) are arranged on the lower side of the seat section.

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The embodiment described and shown in the figures may be modified in many ways. Although not shown in the figures, the right and left hinges 1B, 1C, 1F and 1E in the back and seat are preferably placed an appropriate, small distance from the side pieces 8A and 8B, in order to make the seat easy to fold inwards although the thickness of the back and seat sections is not neglectable, especially when equipped with locking devices.

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Other modifications are to design the back and seat sections with further hinges having their axes parallel to the other hinges, or to make the back and seat sections of flexible material. Moreover, the compression springs 5A and 5B of the locking device may be substituted by other elements keeping bars 3A and 3B in locking position, such as elastic bands acting on the bars 3A and 3B or on the handle 4 with pulling action. The bars 3A and 3B may also be held in position by snap action elements.

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The chassis of the safety seat and the locking device can be produced in a flame retardant polymer, while the springs 5 are made of steel or plastic. Cover and padding may be made of flame and fire resistant materials.

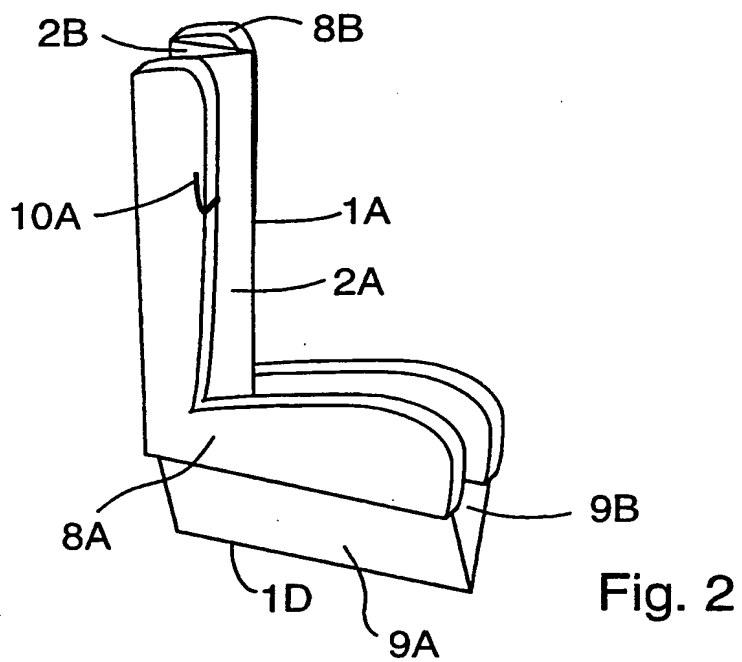
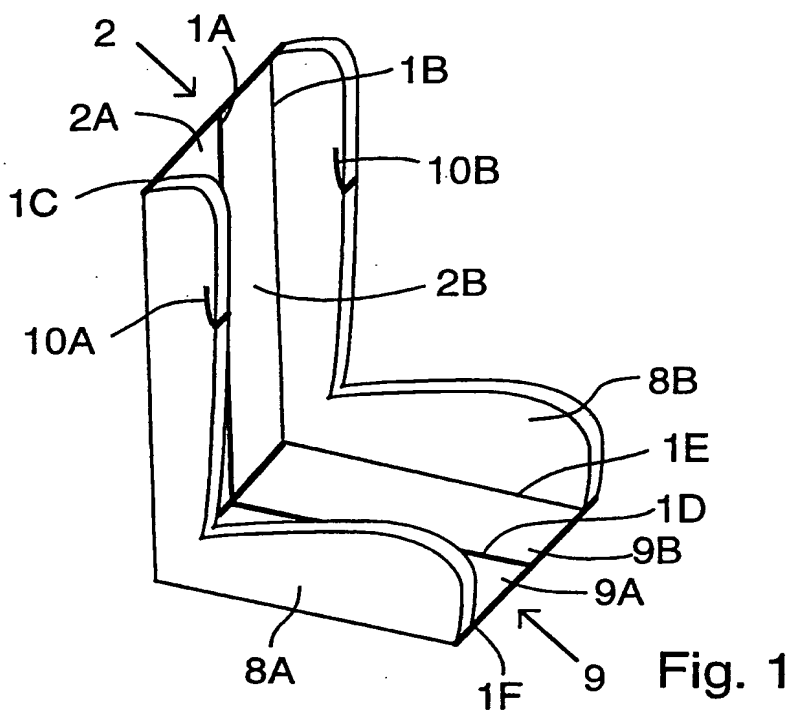
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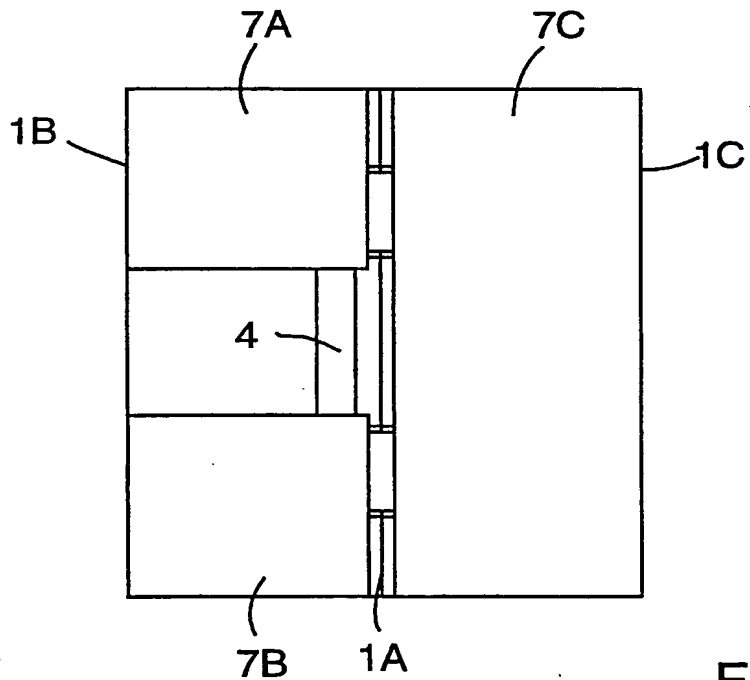
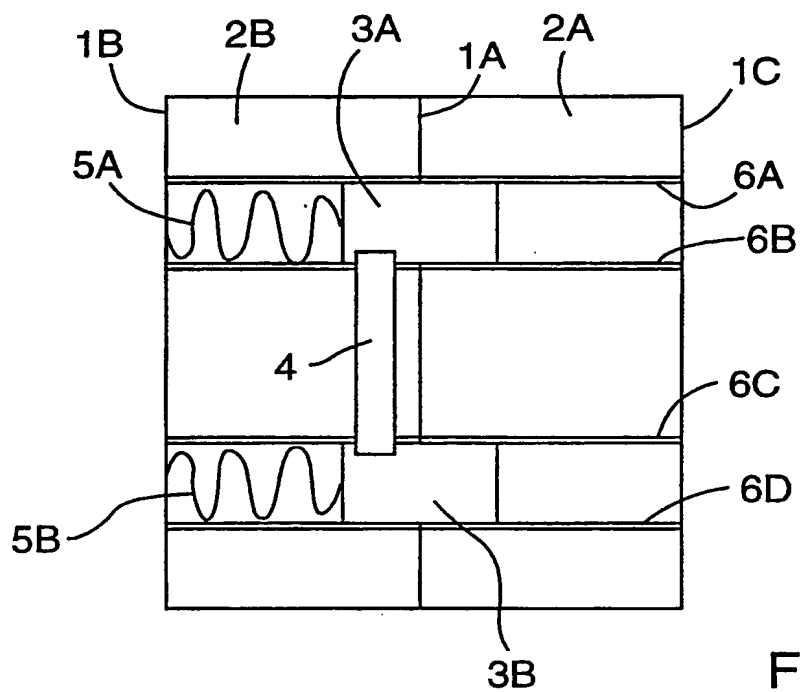
Other realizations are possible within the scope of the following claims. For example the locking devices may be made in any way allowing the safety seat to be locked in a position with the side pieces pulled apart.

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CLAIMS

1. A childs safety seat comprising a seat section, a back section and two side pieces, the safety seat being foldable
5 so as to permit the side pieces to move towards one another.
2. A childs safety seat according to Claim 1 wherein the seat section and the back section each comprises a plurality of pieces connected to one another by hinges having their axes
10 parallel to their respective junctions with the side pieces.
3. A childs safety seat according to Claim 2 wherein each outer edge of the seat section and the back section is connected to the adjacent side piece by a respective hinge.
15
4. A childs safety seat according to Claim 3 wherein there are six hinges, three in the seat section and three in the back section, the hinges in the seat section being parallel to one another and each being in line with a corresponding
20 hinge in the back section.
5. A childs safety seat according to any preceeding claim, wherein the seat and back sections are lockable in unfolded condition by means of locking devices.
25
6. A childs safety seat according to Claim 5 wherein the locking devices each comprise at least one bar slidable across a hinge in the seat or back section between one position in which said bar crosses and locks said hinge, and
30 another position in which said bar is slided clear of said hinge making the seat or back section including said hinge free to fold.
7. A childs safety seat according to any preceeding claim,
35 adapted to be secured to a car seat by a car seat belt.
8. A childs safety seat according to Claim 7 wherein, in use, a child occupant is secured in the childs safety seat by a car seat belt.





INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 95/00311

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B60N 2/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B60N, A47C, A47D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WORLD PATENT INDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	EP, A1, 0589071 (FARINELLI, VITTORIO ET AL), 30 March 1994 (30.03.94), column 8, line 7 - column 10, line 16, figures 8-14 --	1,5,7,8
A	EP, A2, 0154427 (SWIFT, THOMAS RICHARD), 11 Sept 1985 (11.09.85) --	1-8
A	WO, A1, 8901882 (AB AKTA BARNSÄKERHET), 9 March 1989 (09.03.89) --	1-8

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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International application No.
PCT/SE 95/00311

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE, A1, 2840536 (CARL STAHL GMBH & CO KG), 27 March 1980 (27.03.80) -- -----	1-8

INTERNATIONAL SEARCH REPORT
Information on patent family members

03/05/95

International application No.
PCT/SE 95/00311

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A1- 0589071	30/03/94	NONE	
EP-A2- 0154427	11/09/85	SE-T3- 0154427 GB-A,B- 2154131 JP-A- 60259535	04/09/85 21/12/85
WO-A1- 8901882	09/03/89	AU-A- 2317588 DE-A- 3872511 EP-A,B,B 0328615 SE-T3- 0328615 JP-T- 2501377 NO-C- 166524 SE-A- 8703323 US-A- 5121965	31/03/89 06/08/92 23/08/89 17/05/90 01/02/94 28/02/89 16/06/92
DE-A1- 2840536	27/03/80	NONE	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL05/00215

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : A47D 1/10 US CL : 297/254, 255 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 297/254, 255 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1,299,827 A (EDWARDS) 08 April 1919 (08.04.1919), see entire document.	1-12
X	US 2,450,301 A (QUIGGLE) 28 September 1948 (28.09.1948), see entire document.	1, 3-4, 8-, 11-12
X	US 5,810,437 A (SHARPE) 22 September 1998 (22.09.1998), see entire document.	1, 3, 9-12
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